

REMARKS

Claims 1-33 were presented for examination and were pending in this application. In an Office Action dated December 21, 2004, Claim 12 was objected to as allowable if rewritten in independent form, and Claims 1-11 and 13-33 were rejected. Applicant thanks Examiner for Allowance of Claim 12. Applicant also thanks Examiner for examination of the claims pending in this application and addresses Examiner's comments below.

Applicant herein amends Claims 10, 15, 16, 18, 19, and 21-32. New Claim 34 is added. These changes are believed not to introduce new matter, and their entry is respectfully requested. The claims have been amended to expedite the prosecution of the application in a manner consistent with the Patent Office Business Goals, 65 Fed. Reg. 54603 (Sept. 8, 2000). In making these amendments, Applicant has not and does not narrow the scope of the protection to which Applicant considers the claimed invention to be entitled and does not concede that the subject matter of such claims was in fact disclosed or taught by the cited prior art. Rather, Applicant reserves the right to pursue such protection at a later point in time and merely seeks to pursue protection for the subject matter presented in this submission.

Based on the above Amendment and the following Remarks, Applicant respectfully requests that Examiner reconsider all outstanding objections and rejections, and withdraw them.

IN THE DRAWINGS:

Applicant herein amends FIGS. 2, 4, 5, and 6.

Replacement Sheets for drawing sheets 1, 3, and 4, previously submitted, are attached. The first replacement sheet includes FIG. 1 (original) and FIG. 2 (amended). The second replacement sheet includes FIG. 4 (amended) and FIG. 5 (amended). The third replacement sheet includes FIG. 6 (amended).

In addition, changes to the Figures are noted in red in the Annotated Marked-Up Drawings sheets, which are also attached for the Examiner's convenience.

Amendments to the Specification

Amendments to paragraphs [0025], [0026], [0027], [0028], [0029], and [0039] were made to correct grammatical errors, to correct typographical errors, or to properly reference items labeled in the figures. No new matter is introduced as a result of the amendments.

Amendments to the Claims

Amendments to Claim 10 were made to more clearly recite the subject matter claimed. No new matter is introduced as a result of the amendments.

Amendments made to Claims 15, 18, 19, 23-26, and 32 were made to correct typographical errors noticed by Applicant during prosecution. No new matter is introduced as a result of the amendments.

Amendments to Claims 28, 29, and 31 were made to explicitly recite aspects that previously were inherent. No new matter is introduced as a result of the amendments.

An amendment to Claim 31 was made to correct antecedent basis noticed by Applicant during prosecution. No new matter is introduced as a result of the amendment.

Amendments to Claims 16, 18, 21-23, and 25-31 are discussed in more detail below in response to Examiner's specific objections and rejections.

Objections and Amendments to the Drawings

In compliance with 37 C.F.R. § 1.121, Applicant submits and requests acceptance of Replacement Sheets for drawing sheets 1, 3, and 4. Sheets labeled "Annotated Marked-up Drawings" showing amendments made to FIGS. 2 and 4-6 are included for the Examiner's convenience.

Regarding FIG. 2:

The Examiner objected to FIG. 2, stating, “[t]he drawings are objected to because first tunable variable capacitor ‘C₁’ (page 8, paragraph [0028]) is not shown on the drawing.”

Applicant has amended FIG. 2 to properly identify first tunable variable capacitor C₁. Applicant has also amended paragraphs [0028] and [0029] to properly reference capacitors C₁ and C₂ in FIG. 2. No new matter is introduced as a result of the amendments.

Regarding FIGS. 4-6:

Applicant has amended FIGS. 4-6 to properly identify bias resistances R_{b4}, R_{b5}, and R_{b6}, as referenced in the specification, particularly paragraphs [0037] to [0039] and paragraph [0042]. No new matter is introduced as a result of the amendments.

Approval of the Proposed Drawing Changes is respectfully requested. It is also respectfully requested that the Examiner explicitly indicate his approval thereof in the next official communication.

Response to Claim Objections

Regarding Claim 26:

In the 3rd paragraph on page 2 of the Office Action, Examiner objected to Claim 26, stating, “In claim 26, ‘the second tunable thin-film BST capacitor’ and the ‘first tunable thin-film BST capacitor’ lack antecedent basis.”

Applicant has amended Claim 26 to recite, “The tuning circuit of claim 25, wherein the second tunable thin-film BST capacitor is set to a value substantially equal to the at least

one tunable thin-film BST capacitor in that adjustable capacitance grouping.” (Emphasis added).

The amendment to provide dependency from Claim 25 provides the antecedent basis for the “second” tunable thin-film BST capacitor. The amended reference to the “at least one” tunable thin-film BST capacitor provides the antecedent basis for the capacitor initially defined in Claim 22.

Applicant respectfully submits that antecedent basis is now proper and requests withdrawal of the objection to Claim 26.

Regarding Claim 32:

In the 1st paragraph on page 3 of the Office Action, Examiner objected to Claim 32, stating, “In claim 32, ‘the first tunable thin-film BST capacitor’ lack antecedent basis.”

Applicant has amended Claim 30 to recite, “The tuning circuit of claim 28, wherein the means for capacitance comprises a first tunable thin-film barium strontium titanate (“BST”) capacitor.” (Emphasis added). Applicant has also amended Claim 31 to depend from Claim 30. Claim 32 depends from Claim 31. The amendments to Claims 30 and 31 provide the antecedent basis for the “first” tunable thin-film BST capacitor recited in Claim 32.

Applicant respectfully submits that antecedent basis is now proper and requests withdrawal of the objection to Claim 32.

Response to Rejection Under 35 U.S.C. § 112, Paragraph 2

Regarding Claims 16-27:

In the 3rd paragraph on page 3 of the Office Action, Examiner rejected Claims 16-27 as allegedly not specifically pointing out and distinctly claiming the subject matter that the Applicants regard as the invention. The Examiner stated:

Claims 16-27 are rejected ... as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. ... The omitted structural cooperative relationships are: the structural relationship among first, second and third adjustable capacitance groupings, and first, second and third leads to form a bridge circuit.

Applicant has amended Claims 16, 18, 21, 22, 23, 25, and 27 as shown above.

Representative independent Claim 16, as amended, recites (emphasis added):

A tuning circuit comprising:

a bridge circuit comprising

a first adjustable capacitance grouping coupled between a first node and a second node,

a second adjustable capacitance grouping coupled between the first node and a third node, and

a third adjustable capacitance grouping coupled between the second node and the third node,

wherein each adjustable capacitance grouping comprises at least one tunable capacitor coupled between a one of the nodes associated with that grouping and a bias port; and

a first lead coupled to the first node and a second lead coupled to the second node, the leads configured to couple the bridge circuit with a coupling element coupled between the first node and the second node and with a shunt element coupled to a first end of the coupling element.

Independent Claim 22 is generally similar to independent Claim 16.

Amended Claims 16 and 22 now recite the structural cooperative relationships among the first, second, and third adjustable capacitance groupings and among the first and second leads, as required by the Examiner. None of Applicant's Claims 16-27 recites a "third lead;" therefore, no structural relationships regarding a "third lead" are needed. Amended Claims 18 and 23 recite structural cooperative relationships relating to "a bulk capacitor." Amended Claims 21 and 27 recite structural cooperative relationships relating to "a bias resistance" and "a bias resistor," respectively. Amended Claim 25 recites structural cooperative relationships relating to "a second tunable thin-film BST capacitor." Applicant submits that Claims 17, 19, 20, 24, and 26 do not omit any necessary structural connections and thus have not been amended except as needed to correct typographical errors or to address other objections or rejections noted by Examiner, as discussed elsewhere in this paper.

Applicant respectfully submits that Claims 16-27 now comply with the requirements of 35 U.S.C. § 112, second paragraph, and requests withdrawal of the rejection of Claims 16-27.

Regarding Claims 28-33:

In the 4th paragraph on page 3 of the Office Action, Examiner rejected claims 28-33 as allegedly not specifically pointing out and distinctly claiming the subject matter that the Applicants regard as the invention. The Examiner stated:

In claim 28, lines 9 and 10, "**a means for coupling** the means for reactance adjustment with **a mean for coupling** and a means for shunting in the electrical circuit" is vague and confusing as to whether "a means for coupling" in the first occurrence and second occurrence refer to the same coupling mean.

Applicant has amended Claim 28 to recite “a *means for electrically coupling* the means for reactance adjustment in parallel with a *means for coupling* and in series with a means for shunting in the electrical circuit” (emphasis added) to show that the “means for electrically coupling” is distinct from the “means for coupling.” Applicant has amended the preamble of Claim 29 to recite “The tuning circuit of claim 28, wherein the means for electrically coupling includes ...” (emphasis added) to distinguish the “means for electrically coupling” in the preamble from the “means for coupling” recited in the body of Claim 29. Applicant submits that Claims 30-33 do not refer either to the “means for electrically coupling” or the “means for coupling,” and so do not require any amendment under this section.

Applicant respectfully submits that Claims 28-33 now comply with the requirements of 35 U.S.C. § 112, second paragraph, and requests withdrawal of the rejection of Claims 28-33.

In summary, the amendments to Claims 16, 18, 21, 22, 23, 25, 27, 28 and 29 were made so as to more clearly define the invention, and not to narrow their scope of protection with respect to the prior art, or with respect to potentially infringing devices, compositions, or articles.

Response to Rejection Under 35 U.S.C. § 102(e)

On page 4 of the Office Action, the Examiner rejected Claims 16-33 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,690,251 to Toncich (“Toncich”). This rejection is now traversed.

Regarding Claims 16, 17; 22; and 28:

The Examiner stated:

Toncich (fig. 8b) discloses a tuning circuit comprising: a bridge circuit 450 comprising: first second and third adjustable capacitance groupings (412a & 410a, 412b & 410b, 437a & 437b); each adjustable capacitance grouping comprising at least one tunable BST (or "a high intrinsic capacitance density and a field-dependent electrical permittivity") capacitor 410a, 473a, 437b, 410b and a bias port (see fig. 7, VDC); and first, second and third leads (the nodes that connect 437a & 410a, 437b & 410b, 410a & 410b) configured to couple the bridge circuit with a coupling element 434a or 406 and a shunt element 404 or 408.

Applicant has amended representative independent Claim 16 to recite:

A tuning circuit comprising:

- a bridge circuit comprising

- a first adjustable capacitance grouping coupled between a first node and a second node,

- a second adjustable capacitance grouping coupled between the first node and a third node, and

- a third adjustable capacitance grouping coupled between the second node and the third node,

- wherein each adjustable capacitance grouping comprises at least one tunable capacitor coupled between a one of the nodes associated with that grouping and a bias port;
 - and

- a first lead coupled to the first node and a second lead coupled to the second node, the leads configured to couple the bridge circuit with a coupling element coupled between the first node and the second node and with a shunt element coupled to a first end of the coupling element.

Applicant has similarly amended independent Claims 22 and 28.

Applicants respectfully submit that amended Claims 16, 22, and 28 are distinguishable over Toncich for at least two reasons. First, in a rejection under 35 U.S.C. § 102, each and every claim element must be present in the applied reference, and amended Claims 16, 22, and 28 recite structural cooperative relationships not present in Tonich. In particular, Claim 16 recites “a first adjustable capacitance grouping coupled between a first node and a second node...,” and “a coupling element coupled between the first node and the second node ...” Claim 22 recites similar structural relationships. Claim 28 recites “a means for reactance adjustment ...” and “a means for electrically coupling the means for reactance adjustment in parallel with a means for coupling...” (emphasis added). These relationships clearly recite a parallel relationship between the “first adjustable capacitance grouping” and the “coupling element” (or between the “means for reactance adjustment” and the “means for coupling”).

In contrast to the claimed invention, neither “coupling element 434a or 406,” as identified by Examiner, are coupled in parallel with any of the capacitance groupings identified by the Examiner: as shown in Toncich Fig. 8b, one terminal of capacitor 434a (and also of 434b) is floating. In fact, Examiner acknowledged that “Toncich does not clearly show a first tunable capacitor coupled in parallel with a coupling element,” with respect to Claims 1-11 and 13-15. Applicant submits that Toncich also does not show a “capacitance grouping” (or “means for reactance adjustment”) coupled in parallel with a “coupling element” (or “means for coupling”), as recited in Applicant’s amended Claims 16, 22, and 28.

Second, Applicant submits that the “coupling elements” identified by the Examiner in Toncich Fig. 8b are not properly identified as coupling elements and thus Toncich does not

disclose the structure of Applicant's amended Claims 16, 22, and 28. In particular, element 406 in Toncich Fig. 8b is an output port; similarly, element 402 is an input port. Toncich indicates that "[a]n RF signal is received at input port 402 and output at output port 406." (col. 17, lines 9-10). Thus, Applicant submits that "ports" 402 and 406 are not equivalent to "coupling elements" (or "means for coupling"), as recited in Applicant's Claims 16, 22, and 28.

Additionally, elements 434a/b in Toncich are input/output capacitors (col. 17, lines 9-10), which are present generally in many electrical circuits and thus serve no distinct functional purpose specific to tuning circuits or bridge circuits. Thus, "input/output capacitors" 434a/b are not equivalent to "coupling elements" (or "means for coupling"), as recited in Applicant's Claims 16, 22, and 28. Moreover, identification of elements 410a/b in Toncich as "coupling elements" might be more appropriate since elements 410a/b form part of the first/second stages of the bandpass filter disclosed in Toncich Fig. 8b (col. 16, lines 64-66). Identification of elements 437a/b in Toncich as "coupling elements" might also be more appropriate since elements 437a/b couple shunt elements 404 and 408 of Toncich. However, identification of either elements 410a/b or 437a/b as "coupling elements" would mean that Toncich could not disclose all of the "capacitance groupings" recited by Applicant's amended Claims 16, 22, and 28 and identified by Examiner. Thus, Applicant respectfully submits that the circuit disclosed by Toncich Fig. 8b does not anticipate Applicant's amended Claims 16, 22, or 28.

As Claim 17 is dependent on Claim 16, all arguments advanced above with respect to Claim 16 are hereby incorporated so as to apply to Claim 17.

Based on the above Amendment and the preceding Remarks, Applicant respectfully submits that for at least these reasons Claims 16, 17, 22, and 28 are patentably distinguishable over the cited reference. Therefore, Applicant respectfully submits that the rejection is improper and requests that Examiner reconsider and withdraw the rejection under 35 U.S.C. § 102.

Regarding Claims 18-21; 23-27; and 29-33:

The Examiner stated:

Regarding claims 18 and 23, Toncich also shows at least one of adjustable capacitance groups further comprises a bulk (i.e., fixed) capacitor 412a, 412b.

Regarding claims 19, 24, 26, 31 and 32, Toncich also shows at least one of adjustable capacitance groups/at least one means for capacitance having first and second tunable thin-film BST capacitors 437a, 437b and set to a value substantially equal to each other (col. 17, lines 30-41).

Regarding claims 21, 27 and 33, Toncich shows a tunable capacitor connected to a bias port 142 and a bias resistor 164 to receive a bias voltage VDC (see fig. 7).

As Claims 18-21, 23-27, and 29-33 depend from Claims 16, 22, and 28, respectively, all arguments advanced above with respect to Claims 16, 22, and 28 are hereby incorporated so as to apply to Claims 18-21, 23-27, and 29-33.

Response to Rejection Under 35 U.S.C. § 103(a) in View of Toncich

On page 5 of the Office Action, the Examiner rejected Claims 1-11 and 13-15 under 35 U.S.C. § 103(a) as allegedly being unpatentable in view of Toncich (U.S. Patent No. 6,690,251 as referenced previously). This rejection is respectfully traversed.

Regarding Claims 1 and 10:

The Examiner stated:

Toncich is applied as above. Toncich (fig. 8b) discloses a similar tunable capacitive bridge coupled to a plurality of shunt elements 405, 408. Toncich does not clearly show a first tunable capacitor coupled in parallel with a coupling element. However, it should be noted that Toncich teaches the first and second shunt elements 405, 408 are electromagnetically coupled (col. 6, lines 9-12). Therefore, it would have been obvious to provide a coupling element instead of electromagnetic coupling between the shunt elements in the device of Toncich since they are functionally equivalent.

Based on the following Remarks, Applicant respectfully submits that for at least these reasons Claims 1 and 10 are patentably distinguishable over the cited reference. Therefore, Applicant respectfully requests that Examiner reconsider the rejection, and withdraw it.

Applicant's Claim 1 recites "a first tunable capacitor coupled in parallel with a coupling element...." Applicant's Claim 10 recites "a first tunable thin-film barium strontium titanate ("BST") capacitor coupled in parallel with the coupling element...." As discussed above with respect to the rejections of Claims 16, 22, and 28 under 35 U.S.C. § 102(e) and acknowledged by Examiner, "Toncich does not clearly show a first tunable capacitor coupled in parallel with a coupling element." Thus, Applicant respectfully submits that the arguments made in response to the 35 U.S.C. § 102(e) rejections apply here as well, and Toncich does not disclose the structure recited by Applicant's Claim 1 or Claim 10.

Furthermore, Applicant respectfully disagrees with the Examiner's assertion that "it would have been obvious to provide a coupling element instead of electromagnetic coupling between the shunt elements in the device of Toncich since they are functionally equivalent." "Coupling elements" and "electromagnetic coupling" are not functionally equivalent because electromagnetic coupling relies on electromagnetic fields (i.e., electric fields and magnetic fields) to provide the coupling (e.g., to induce electric current). On the other hand, "coupling elements" as recited in Applicant's Claims 1 and 10 provide electrical coupling, and potentially direct current flow, based on an explicit connection. Therefore, an explicit

coupling element should be recited if intended in a cited reference, as Applicant has done in Claims 1 and 10. Additionally, shunt elements of ladder networks are not always “electromagnetically coupled along their entire length” (emphasis added) as recited in Toncich col. 6, line 11-12. Applicant’s Claims 1-11 and 13-15 have no such limitation or suggestion.

Therefore, the Examiner has not pointed out any prior art teaching that anticipates or renders obvious the explicit recitation in the language of Applicant’s Claim 1, which recites “a first tunable capacitor coupled in parallel with a coupling element...,” or in the language of Applicant’s Claim 10, which recites “a first tunable thin-film barium strontium titanate (“BST”) capacitor coupled in parallel with the coupling element...” Therefore, it is respectfully submitted that the rejection is improper and should be withdrawn.

For at least the above reasons, Applicant respectfully asserts that Claims 1 and 10 are patentable over Toncich, and therefore, respectfully requests that Examiner reconsider and withdraw the rejection.

Regarding Claims 2-9; 11 and 13-15:

The Examiner stated:

Regarding claims 2, 3, 14 and 15, Toncich discloses the shunt elements 405, 408 are coupled to a ground (i.e., short-circuited, col. 16, lines 65-67), and the second and third tunable capacitors are coupled to a ground (see fig. 7, the tunable capacitor 104 is coupled to a ground through a via 168).

Claims 2-9 depend from Claim 1, and Claims 11 and 13-15 depend from Claim 10, and independent Claim 10 is generally similar to independent Claim 1. Applicant submits that all arguments advanced above with respect to Claims 1 and 10 are hereby incorporated so as to apply to Claims 2-9, 11, and 13-15. Thus, Applicant respectfully asserts that Claims

2-9, 11, and 13-15 are also patentable over Toncich, and therefore respectfully requests that the Examiner reconsider and withdraw the rejection.

Allowable Subject Matter

On page 5 of the Office Action, the Examiner stated:

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant thanks Examiner for Allowance of Claim 12. Applicant has rewritten original Claim 12 as new Claim 34 to satisfy the Examiner's formal objection without any narrowing or additional limitation of its scope.

CONCLUSION

In sum, Applicant respectfully submits that Claims 1 through 34, as presented herein, are patentably distinguishable over the cited references (including references cited, but not applied). Therefore, Applicant requests reconsideration of the basis for the rejections to these claims and requests allowance of them.

In addition, Applicant respectfully invites Examiner to contact Applicant's representative at the number provided below if Examiner believes it will help expedite furtherance of this application.

Respectfully Submitted,
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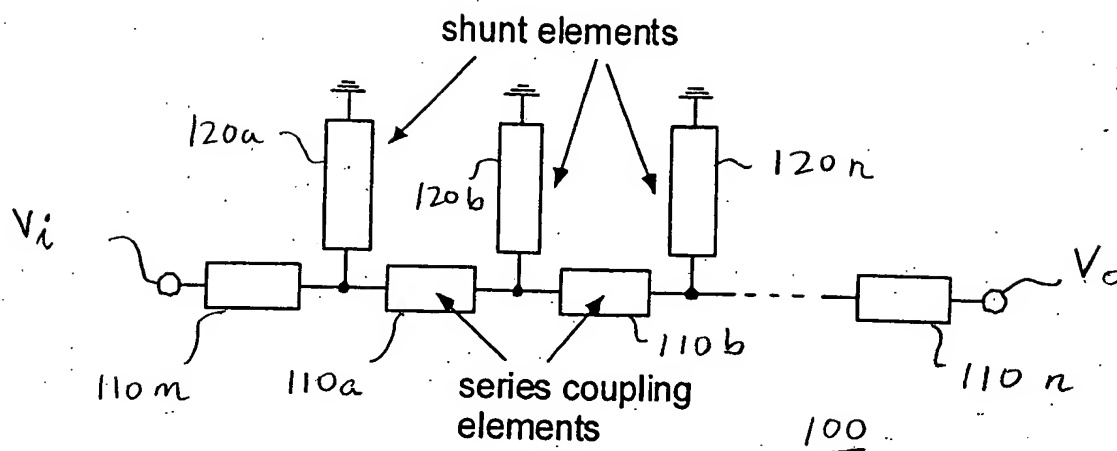


FIG. 1

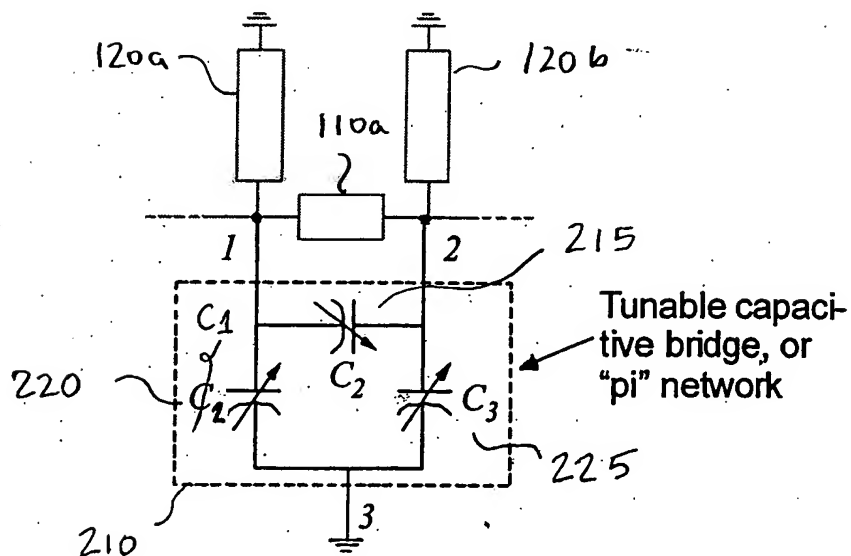


FIG. 2

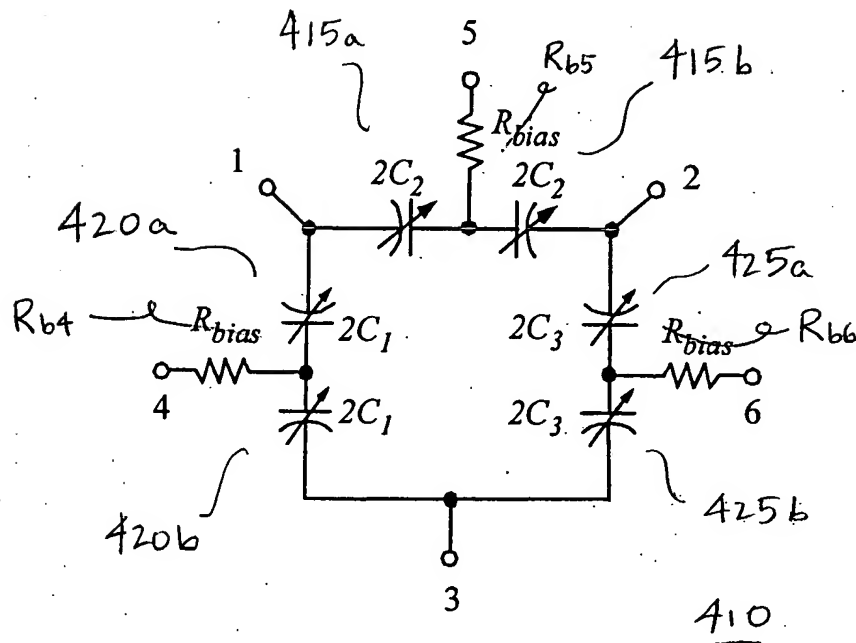


FIG. 4

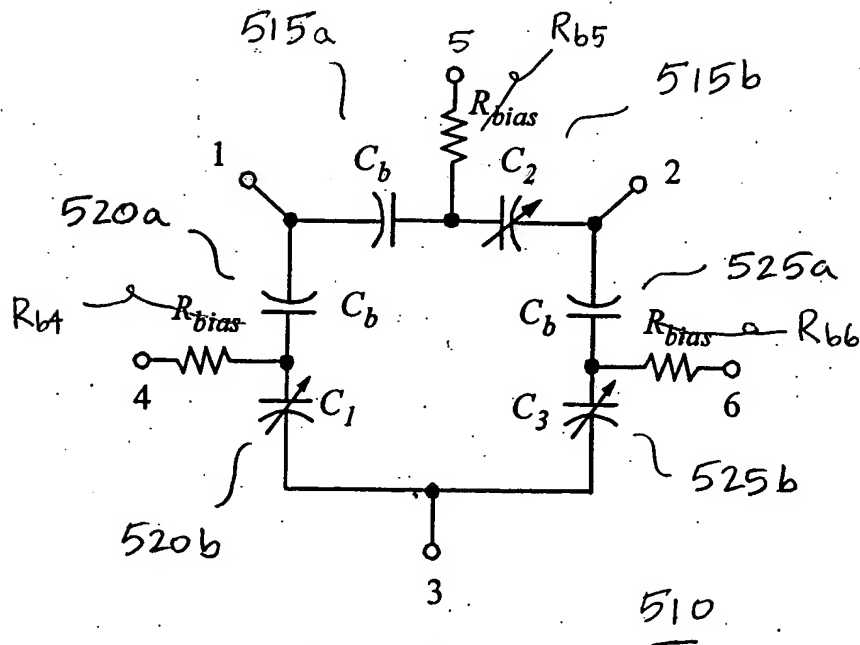


FIG. 5

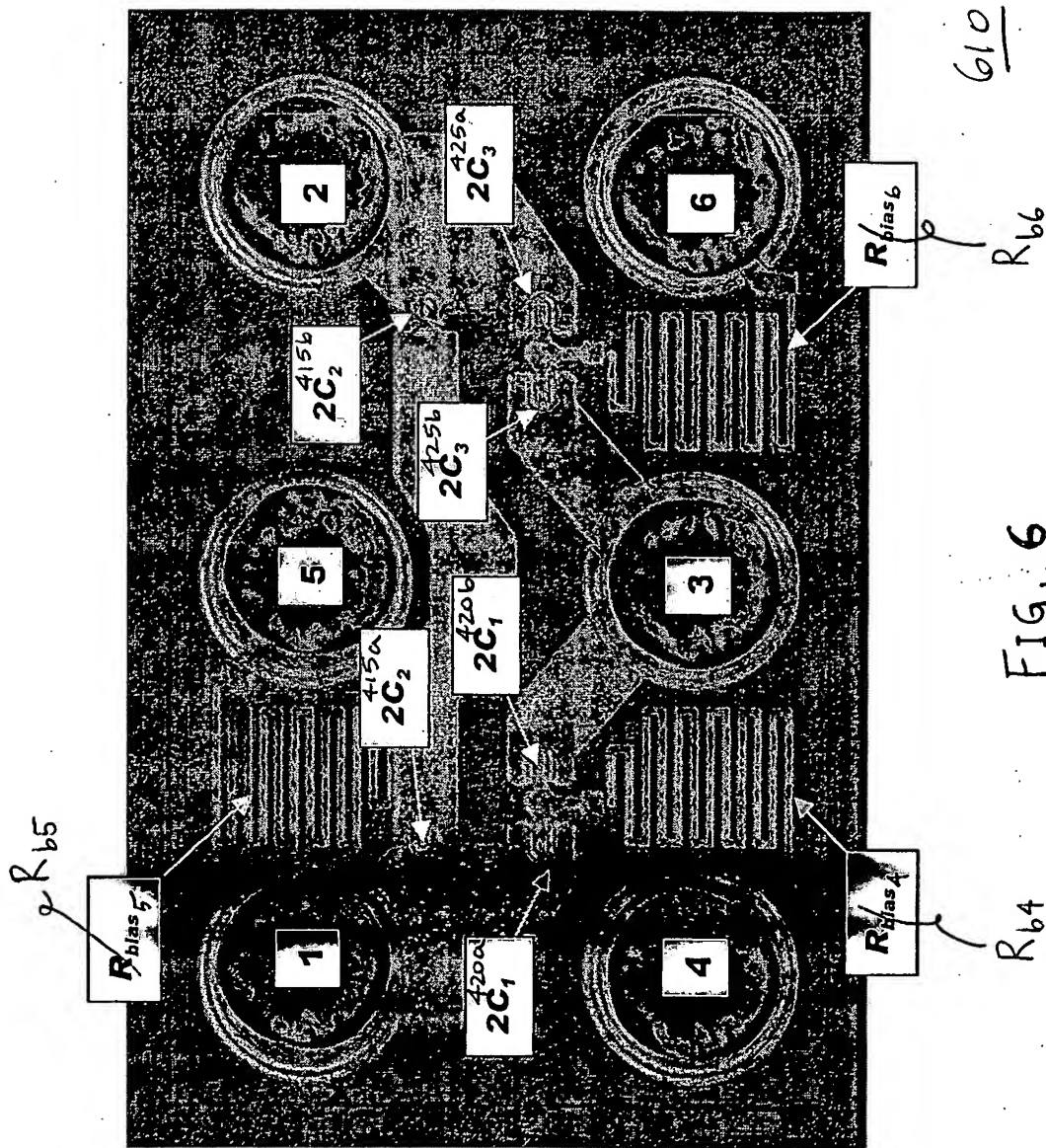


FIG. 6